

What is claimed is:

1. A matrix switch made up of a plurality of crosspoint switches, characterized in that:

the matrix defines upstream connections,  
downstream connections, and user connections and provides  
bi-directional switching capability between the upstream  
and downstream connections, between every user and every  
upstream connection, between every user and every  
downstream connection, and between every user and every  
other user connected to the matrix while requiring fewer  
than half of the number of switching points that would be  
required by a single, standard NxN crosspoint switch  
interconnecting all the inputs and outputs.

2. A matrix switch made in accordance with Claim 1, and further including a circuit for equalizing signals upon receipt and before introducing the signals to the matrix switch.

3. A network, including a user interface for every user and at least one matrix switch as recited in Claim 2, wherein each user interface also includes a circuit for equalizing signals upon receipt of the signals at the user interface from the matrix.

4. A network, as recited in Claim 3, and further comprising circuitry to convert signals from common mode to differential mode before sending them out of the matrix over twisted pair wiring.

5. A device for the simultaneous, bi-directional transmission of video bandwidth signals in the local area network environment, comprising:

- a plurality of user ports;
- a plurality of channel up ports;
- a plurality of channel down ports;

a switching matrix, comprising:

a plurality of interconnected NC x NU cross-point switches, where NC is the number of channel up ports and NU is the number of user ports; and

a plurality of buffers which define the direction of transmission between the cross-point switches;

wherein said switching matrix permits the simultaneous, bi-directional transmission of video bandwidth signals between users, between users and up channels, and between users and down channels.

6. A method for the simultaneous transmission of analog video and digital data signals on twisted pair cable, comprising the steps of:

transmitting the analog video signal on a first pair of wires;

carrying the digital data signal on a second pair of wires in the same twisted pair cable;

transmitting a second analog video signal on a third pair of wires in the opposite direction from the direction in which the signal is sent on the first pair of wires; and

transmitting a second digital data signal on a fourth pair of wires in the opposite direction from the direction in which the data is sent on the second pair of wires; with all four pairs of wires being in the same twisted pair cable.

7. A method for the simultaneous transmission of analog video and digital data signals on twisted pair cable, comprising the steps of:

transmitting the analog video signal on a first pair of wires;

carrying the digital data signal on a second pair of wires in the same twisted pair cable;

attenuating the digital data signal to reduce

its voltage before sending it out over the twisted pair wires in differential mode, so as to reduce the interference between the digital data signal and the analog video signal.

5           8. A method for the simultaneous transmission of analog video and digital data signals on twisted pair cable as recited in Claim 7, and further comprising the step of equalizing the video and digital data signals upon reception of the signals over twisted pair wiring.

10           9. A method as recited in Claim 7, and further comprising the step of sending the analog video and digital data signals to the same switching matrix, so they can all be switched and sent to various users connected to the switching matrix.

15           10. A method for automatically equalizing a signal sent over twisted pair wiring, comprising:

          sending a known reference frequency signal on the twisted pair wiring along with the signal to be equalized;

20           receiving the signal at a reception point; splitting the reference frequency signal off from the signal to be equalized at the reception point;

          measuring the amount of attenuation of the reference frequency signal at the reception point;

25           providing a plurality of circuits which can boost the signal varying amounts; and

          automatically selectively engaging said circuits to equalize the signal depending upon the amount of attenuation measured in the reference frequency.

30           11. A method for automatically equalizing a signal as recited in Claim 10, wherein said signal to be equalized has a bandwidth sufficient to carry an analog video signal.

12. A method for automatically equalizing a signal sent over twisted pair wiring as recited in Claim 11, and further comprising, the step of conducting the method bi-directionally, such that the reception point is also a sending point, and the sending point is also a reception point, and the reference frequency is measured upon reception of signals at both points, and the respective circuits are automatically selectively engaged at both points, depending upon the amount of attenuation of the reference frequency that is measured upon reception at both points.

13, A method for the transmission and switching of analog video and digital data signals, comprising:

- providing a crosspoint switch with input points and output points;
- sending video signals to at least one of said input points;
- simultaneously sending digital data signals to at least another of said input points;
- switching said crosspoint switch so that both video and digital data signals are connected to respective output points at the same time;
- such that analog video signals and digital data travel through the same crosspoint switch at the same time.